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" Scire est nescire, nisi id me
Scire alius sciret."

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GERIATRICS.*
I : THE MEDICAL PROBLEM OF TO-DAY

BY

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The problem of the aged sick in the community to-day is urgent but complex. I propose to consider certain salient features only.

The Population Trend. People are living longer to-day than they did fifty years ago. In this country at the beginning of the century there were about 2½ million people over the age of sixty; to-day there are 7½ millions, and it is estimated that in 1977 there will be 10½ millions. But these figures do not represent the full measure of the problem. For the aged, as we all know, are more prone to incapacitating ailments than the rest of the community and their ailments tend to be chronic or to require prolonged convalescence. From this two results follow directly: first, an increased load is thrown on the home where someone, usually a daughter, has to be responsible for the sick parent or grandparent; secondly, the hospital service, which

* Discussion by the Bristol Medico-Chirurgical Society on Wednesday, 13th December, 1950.

quantitatively at any rate, may have been adequate for the year 1900, is totally inadequate for 1950; and unless the problem is tackled energetically it will have reached the stage of crisis long before 1977.

The Domestic Load. I want to emphasize the effect of these trends on the domestic structure to-day. Sheldon, in a survey of the problem in Wolverhampton, found that 7.7 per cent. of the old people seen were causing such strain on the home that the individual mainly responsible for nursing care was turned into a drudge. Here is a group indeed for whom we might say it is the clear duty of the state to take responsibility by providing accommodation for them in hospitals, homes or hostels. But you may measure this aspect of our problem to some extent when I say that were the state to provide institutional care for this group we should have to increase our present accommodation fourfold.

The Hospital Problem. The hospital side of the problem is familiar to everyone. Nevertheless it may be worthwhile to look at it statistically as we find it in an isolated geographical area such as West Cornwall. And first we must not forget that every hospital and every speciality (excepting those dealing with obstetrics and pediatrics) is directly concerned, though some of course more than others. On a single day in Cornwall it was found by taking a census, that the aged population in hospitals of all sorts represented 2.5 per cent. of the total, only 0.9 per cent. being in hospitals of the geriatric service. On the same day 40 per cent. of all occupied beds were occupied by patients over sixty.

Now all this adds up to the fact that the hospitals are dealing on an increasing scale with the ailments of old age. Much of this is as it should be, but much is due to inadequacy of the service being provided in the special hospitals for this age-group. So let us look for a moment at these hospitals for the aged sick. For it is certain that here is the crux of the problem so far as the present day is concerned.

The provision of institutional care in this country dates mainly from the early part of the nineteenth century. These grim grey buildings were originally intended to cope with destitution. Gradually parts of them were converted to hospital

wards and in these nursing and a mnimium of medical care was provided. The buildings so adapted were often entirely unsuitable for hospital purposes. All types of patients might be found in one building and even in one ward. There were no X-ray or laboratory facilities, no consultant staff. The shortage of nursing staff was often acute though the quality of nursing care was good. One result of this was that the patients were put to bed where they were out of the way and safe. Up and about they tripped over things and fell downstairs. So they were kept in bed and gradually their limbs and abdominal muscles atrophied and then contracted. Their joints became ankylosed, they developed kyphosis. Mental apathy followed by senile dementia with incontinence completes the picture of thousands of old people in these hospitals to-day.

To remedy this state of affairs in a clinical area such as West Cornwall action is required along three lines:

(*a*) Careful examination and classification of patients.

(*b*) The establishment of an active rehabilitation centre.

(*c*) Segregation of various groups such as the psychiatric patients and the long-stay-irremediable.

The most serious difficulty arises with the frail ambulant patient, who is scarcely fit for the rigorous life in an institution, but for whom the local authority may not be able to find hostel accommodation.

Economic and other considerations have led both in this country and America to serious attempts to provide a domiciliary service which will parallel in efficiency that provided by the hospital. The ingredients of such a service are to hand in this country in the form of the specialist domiciliary service, the general practitioner, the nursing service, home helps, free laundry, mobile meals and physiotherapy. A number of different authorities, however, are concerned, and some co-ordinating body is needed to bring together all the agencies working on behalf of old people.

The necessity for educating the medical student in the clinical and social aspects of this problem is apparent when the population trend is considered. The aged must be maintained in health and employment as long as possible. Indeed it may

be said that if the achievement of medicine in the last fifty years has been that of adding years to the life of man the problem of the next fifty is that of adding life to his years.

Yet it would be a mistake to regard this as altogether a problem in social medicine. Geriatrics, like pediatrics needs a sound basis in research and clinical observation. From that point of view we can hardly say we have made a beginning. And one of the greatest dangers of the hour is that the necessity for a sound clinical background may be lost sight of in the welter of social problems which are constantly arising.

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GERIATRICS.
II : MODERN DEVELOPMENTS

BY

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The problem of infirmity in old age can no longer be disregarded. The problem is, of course, that of the elderly sick who formerly remained at home as invalids, or gravitated to the chronic wards of hospitals or Public Assistance institutions. Geriatrics is primarily concerned to-day with the treatment of disease and the restoration of as great a degree of personal independence as possible to these elderly patients. Many of the disorders of this age-group were regarded with fatalism in the past, often unjustifiably: and so received less than their fair share of consideration either with regard to their cause or prevention. Frequently the age of the patient in itself was considered an adequate explanation of a variety of ills which were lightly dismissed on that account.

Incontinence

For example, the elderly incontinent patient in the acute ward received short shrift and was usually rapidly moved to the

nether regions of the hospital. Reference to the scanty literature dealing with incontinence does not indicate any considerable advance in thought during the course of the past few centuries and in comparatively recent years we find the view expressed that it is " probably the result of senile weakness of the musculature concerned and not in a disorder of the nervous controlling mechanism ". Yet we now know that incontinence of urine in old people is not necessarily an irreversible condition and that, by re-education and attention to the underlying pathology, it can frequently be relieved. Cystometric methods have shown us that far from being the result of senile muscular weakness, the vast majority of these cases are caused by an *over-activity* of the neuromuscular bladder mechanism, which results in uncontrolled bladder contractions.

This bladder spasm results from the interplay of two factors: (i) Conditions causing local irritability of the bladder reflex, the commonest being a chronic urinary infection. (ii) Conditions which impair the (cortical) inhibitory control of the bladder reflex—cerebral vascular lesions, cerebral degeneration, constitutional disturbances such as severe anaemia and the like. Both these factors are open to therapeutic attack, the first by relieving local irritant condition, the second by re-education in bladder control. (Figs. 1 and 2.) I merely mention this to illustrate the point that it is essential to consider these disabilities in more detail, to investigate them fully and to try and get at the fundamental causes. The time is past when we might regard them as irrevocable penalties of advancing years.

Inactivity

Perhaps one of the most important advances in the treatment of the elderly sick is the recognition of the evil effects of prolonged inactivity. The chain of infirmities which may result from such inactivity alone includes muscular weakness and atrophy, fixation of joints, postural contractures and the mental apathy and indifference which is so characteristic. Because of the importance of ensuring maximum activity, physical rehabilitation plays a big part in modern geriatric treatment. Suspension therapy has a particular application to this age-group. In the elderly arthritic patient, in addition to the actual condition of

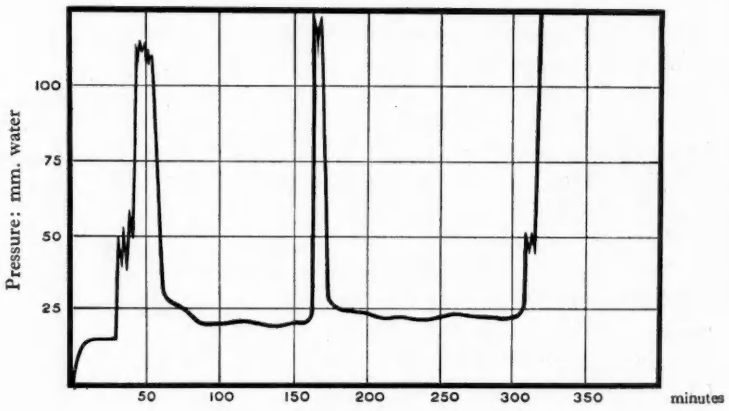


FIGURE 1
Cystometry: periodic bladder spasm

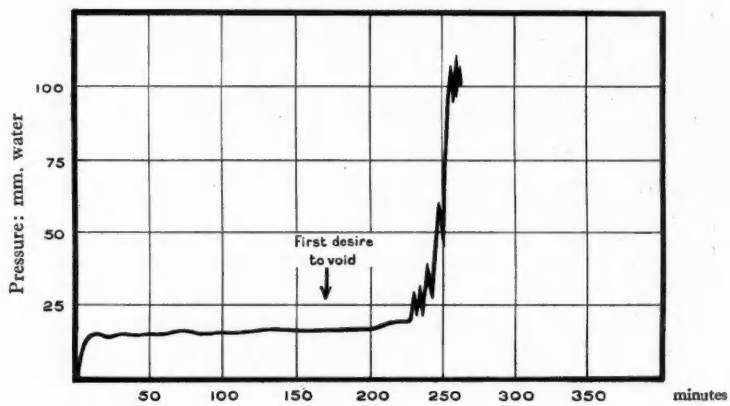


FIGURE 2
Gystometry: restored bladder control

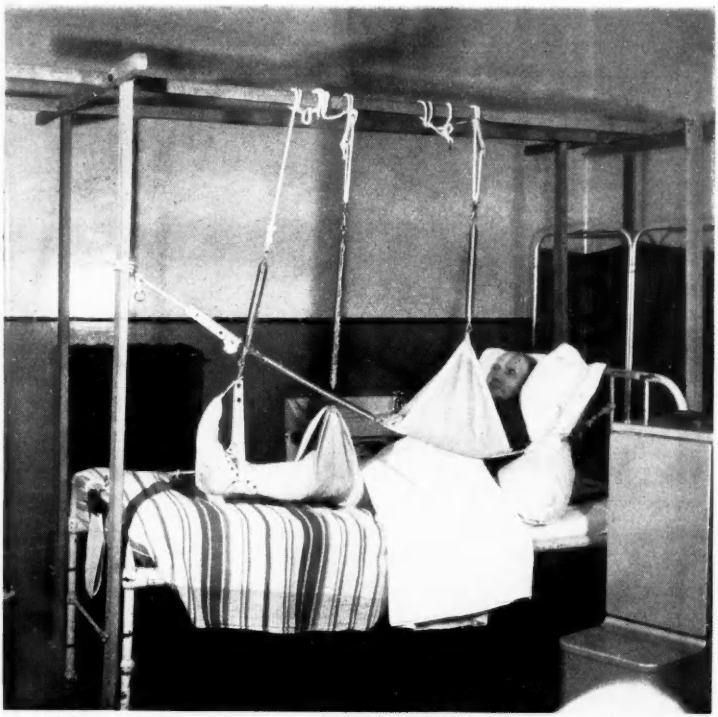
PLATE III

Photograph by Miss P. E. Coleman, M.S.R.

FIGURE 3

Suspension methods for the elderly arthritic.

PLATE IV



Photograph by Miss P. E. Coleman, M.S.R.

FIGURE 4

Use of suspension in treatment of hemiplegia.

the joint and periarticular tissues, mobility is hampered by the weight of the limb, by muscular enfeeblement, by friction and by subconscious muscle guarding, which occurs if pain is likely on movement.

In suspension the effects of gravity are counteracted, friction is eliminated and as movement is under the control of the patient, muscular guarding is minimized. (Plate III, Fig. 3). The result is that one is able to get a greatly increased range of movement and the patient is spurred on to greater efforts, with improvement in muscle power and joint function. In due course, the patient progresses to exercises against spring resistance, the springs being of varying strengths which can be graded according to the individual patient or muscle group concerned.

Hemiplegia

It is in the treatment of the hemiplegic patient that suspension therapy has the greatest application. The paralysed limbs are suspended by slings and springs from a Balkan beam. (Plate IV, Fig. 4).

This has the advantage that the limb is under observation, and one can be sure it is not assuming undesirable postures under the bedclothes. There appears to be a decreased tendency to the development of spasticity in such a limb suspended from the outset. The patient can be encouraged to start active movements at a very early stage and the feeblest of muscular effort will produce a visible result.

Such a patient is allowed to sit up in a chair as soon as possible, usually a matter of several weeks or less, and should start standing exercises at the foot of the bed. These consist merely of the patient sitting in a chair at the foot of the bed, holding on to the bedrail, raising himself to his feet and lowering himself into the chair once again. They are simple exercises which, if carried out assiduously, have excellent results in strengthening musculature and improving stability. From this the patient proceeds to actual walking exercises, either in a walking-chair or a walking-alley. For the arm, pulley exercises are carried out, but recovery in the arm is usually much slower and more incomplete than in the leg.

Untreated hemiplegic patients are a considerable burden on the hospital service. McEwan, in his survey of Bradford chronic hospitals, found that about 15 per cent. of patients were there as a result of a hemiplegia. Many of them had been in hospital a considerable time and the average duration of stay was over two years. By active treatment, especially in the early stages, this burden can be drastically reduced. Of 370 consecutive admissions to Barncoose Hospital, 21 per cent. were hemiplegics. Eighty per cent. of these hemiplegics were classified as severe lesions and the cerebral lesion was often associated with other gross changes which in many cases was the cause of death or prevented intensive remedial measures. Of these patients, one-third died; one-fifth were irremediable, and remained as chair or bedfast invalids; but nearly half became ambulant again. (The average time in hospital was three and a half months.) From these figures it is apparent that of those who survive, over two-thirds can become ambulant again.

GERIATRICS.
III: THE LOCAL PROBLEM

BY

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During the past year I have been occupied partly in making a survey of the aged sick in the Bristol clinical area and partly in trying to develop a scheme to deal with the local geriatric problem. The population of the Bristol clinical area is about 650,000 of whom 13.5 per cent., or 87,750, can be assumed to be over the age of sixty years. Rowntree's (1947) figure of 1.16 per cent. of old people actually in Public Assistance Institutions in May, 1946, would amount to 1,018 for the area; but Sheldon (1948) suggests that 2 per cent. need institutional care giving a figure of 1,755. If we apply the figure of 2.5 per cent. given by Dr. Andrews for Cornwall we should expect to find 2,200 needing hospital or hostel accommodation. Actually the number needing institutional care is much higher than this.

I found a total population of 1,735 occupying hospital beds as shown in the following table:

MAIN CONCENTRATIONS OF AGED SICK IN BRISTOL CLINICAL AREA

Hospital or Institution	Population
Stapleton	526
Bristol Mental Hospital ..	392
Snowdon Road	296
100 Fishponds Road ..	120
Frenchay	39
Chipping Sodbury* ..	108
Thornbury	96
Axbridge	58
General Hospitals	100†
TOTAL	1,735

* These beds have now been handed back to the Local Authority.
† Approximate figure.

In addition there are 850 ambulant old people in local authority and voluntary hostels in Bristol and an unidentified number in similar institutions outside Bristol city which I was unable to visit. A figure of 3 per cent. of old people needing permanent institutional care would be nearer the mark for Bristol, due no doubt to the disrupting effect of seafaring and urbanization on family life in this city. The housing shortage, aggravated by the bombing during the war, has also worsened the position.

The condition in which the aged sick are treated varies from one of these institutions to the other, but they all have certain features in common. There are no laboratory or X-ray departments for diagnosis on the spot; no surgical theatres or

departments of special therapy such as one finds in modern general hospitals. There is a shortage of nurses which is most acute in the peripheral hospitals. Medical staffing is inadequate and, as a consequence, the standards of diagnosis and treatment were generally low. In the absence of modern methods of treatment the number of bedfast cases was, as might be expected, very high, and this made excessive demands on the inadequate nursing staff.

A geriatric centre has been established at Stapleton Hospital. Stapleton was chosen as the most promising centre for a geriatric scheme, although it was realized that the task ahead is going to be difficult. The buildings are old—they were used to house prisoners during the Napoleonic wars. The present population includes psychotics, certified and uncertified; mental defectives, ascertained and unascertained; social misfits, sexual perverts, epileptics, blind people and acute and chronic aged sick and ambulant old people.

A geriatric unit consisting of forty male and eighty female beds for active treatment has been established and a physiotherapy department with three physiotherapists and modern equipment is already functioning. When the young people are discharged there will be room for special departments for X-rays, a laboratory and a small operating theatre: and also long stay annexes for senile dementia cases, frail ambulants and ambulants awaiting discharge. The hospital will house a total of about 700 patients. Special wards for congestive cardiac failure cases have been found necessary and are functioning already. Later there will be special wards for nutritional and metabolic diseases and for orthopaedic cases. This will ensure contact with other branches of medicine and prevent the tendency to isolate the aged sick.

On the administrative side it is proposed to regulate the admissions for the whole clinical area from Stapleton, allocating to each hospital in the geriatric group the cases for which it is best fitted. An almoner's department will deal with admissions and discharges. The problem of discharging convalescents—particularly frail ambulants—is already acute. We believe that if we could dispose of the numbers already accumulated in these two categories the number of aged sick on waiting lists for

admission to hospital would shrink to an insignificant figure. Unfortunately, the disposal of these old people is the subject of infinite haggling between the Hospital and Health Authorities throughout the country and we must await a decision by Parliament for the solution of this very serious problem.

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LIVER FUNCTION TESTS

BY

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The liver may be regarded as a system of branching bile ducts which terminate in numerous blind tubules, the bile canaliculi. The walls are formed by the liver cells, which are externally in contact with the capillaries of the portal venous system and the hepatic arterial system: these cells are homogeneous and show no obvious signs of differentiation or specialization. But in spite of its anatomical simplicity the liver performs a great variety of physiological functions. These are predominantly metabolic, and involve taking up substances from the blood, and liberating the same or other substances into the blood again: they include the intermediary metabolism of the three main classes of food-stuffs, and various syntheses and detoxications. In addition the liver secretes and excretes various substances to form bile.

The liver plays an indispensable part in the body economy and its importance is probably reflected in its great reserve power, for life is possible after more than four-fifths has been destroyed or thrown out of action. It also has great powers of regeneration, probably as a result of its relatively undifferentiated structure. Tests have been devised for almost every known function of the liver. They are therefore numerous, but only a few are of sufficient value and simplicity for routine use.

Many of the tests are based upon the breakdown of haemoglobin to bile pigments, which occurs in the following way. When red blood cells are broken down by the reticulo-endothelial cells, the haemoglobin is converted into " haemo-bilirubin ". This is liberated into the blood stream, carried to the liver and excreted into the bile, slightly modified, as " chole-bilirubin ". In the intestine this pigment is converted by bacterial action into stercobilin, a yellow-brown pigment which gives faeces their normal colour. Some of this is reduced still further to a

colourless substance, stercobilinogen. The stercobilinogen is partially absorbed into the blood stream, and thence is almost completely re-excreted by the liver, except for a trace which appears in the urine, under the name of urobilinogen: on standing, this becomes oxidized back to stercobilin, known in urine as urobilin. Bilirubin itself does not normally appear in the faeces except in new-born infants whose intestines do not yet contain the bacterial flora necessary for converting it into stercobilin.

Blood Bilirubin

The normal plasma bilirubin level is about 0.5 ± 0.3 mg/100 ml. When the level rises to about 2 mg/100 ml., clinical jaundice appears. Jaundice may be of three different types, haemolytic, obstructive or hepatocellular. In haemolytic jaundice, destruction of red cells results in the formation of haemobilirubin more rapidly than it can be excreted by the liver. In obstructive jaundice, there is reabsorption of cholebilirubin from the distended bile passages back into the blood. In hepatocellular jaundice which results from infective, toxic or other conditions which directly damage the liver cells, there is diminished excretion of haemobilirubin which therefore accumulates in the blood: in addition, there is commonly obstruction of the bile canaliculi by swollen liver cells, so that cholebilirubin, too, passes into the blood. Such intrahepatic obstruction may be so severe as to result in almost complete absence of bile from the intestines.

Hepatocellular damage may also be superimposed on the other forms of jaundice: in the haemolytic form due to the associated anaemia and in the obstructive form due to either biliary infection, or to the mechanical effect of a long continued obstruction.

The Van den Bergh test is used to investigate the bile pigments in blood. The direct test is a qualitative test to indicate whether the bilirubin present is mainly cholebilirubin (immediate reaction), haemobilirubin (delayed or negative reaction) or both (biphasic reaction). In recent years its practical value has been questioned on the grounds that if a fairly strong immediate reaction appears, it is difficult to detect a subsequent delayed reaction: and further that a biphasic result is of little diagnostic

value, because it indicates liver cell damage which may be a complication of obstructive or even of haemolytic anaemia as well as the result of a primary hepatocellular jaundice. It must be admitted that the delayed reaction is of little value. But the immediate direct reaction is certainly useful, because it is nearly always absent in haemolytic jaundice, and nearly always present in obstructive or hepatocellular jaundice. The indirect test gives a quantitative estimation of the total bilirubin present, cholebilirubin and haemobilirubin. It is of unquestioned value for this purpose.

The Icterus Index is a simple but crude measure of the plasma bilirubin, by direct comparison with yellow colour standards. Owing to the liability of error due to other yellow pigments, it is not advisable to use it for diagnostic purposes, but it may be useful for following progress in known cases of jaundice.

Bile in Urine

The examination of urine for bilirubin is of great value, especially when a sensitive test (*e.g.* the Harrison-Fouchet test) is used in conjunction with a less sensitive test (*e.g.* the iodine ring test): the former is used to detect very small quantities of bilirubin, the latter to indicate roughly the amount of bilirubin present. Each test reacts with both haemo- and chole-bilirubin. Haemobilirubin does not appear in the urine in more than trace quantities, however high the blood level, so that in uncomplicated haemolytic disease there will either be a reaction with the sensitive test only or none at all. Cholebilirubin, however, appears in the urine in obstructive or hepatocellular jaundice when the plasma level rises above 1 mg/100 ml.: a positive result with the sensitive test may therefore be obtained in the pre-icteric stage. There is not usually enough bilirubin in the urine to give a reaction with the less sensitive test until the plasma level reaches about 2 mg/100 ml. and clinical jaundice is present.

The testing of urine for bile salts is not a very satisfactory or useful procedure.

The urine may contain an excess of urobilin or urobilinogen as a result of increased production (haemolysis), increased absorption from the gut (constipation) or diminished re-excretion

by the liver (hepatocellular disease). The amount in the urine is diminished by obstruction (biliary or intrahepatic) or by diminished absorption (diarrhoea). Thus the amount found may be the result of many opposing factors, but it is generally found to be increased in hepatocellular disease (acute or chronic), haemolytic disease, and many febrile diseases. In obstructive jaundice, the amount in urine depends on the amount of bile reaching the intestine, and the degree of associated liver damage: it is commonly increased in partial obstruction, but always disappears when obstruction is complete. In general, the testing of urine for urobilin or urobilinogen is of rather limited diagnostic value for liver disease.

Bile in Faeces

The colour of the stools should always be noted, for in the absence of steatorrhoea it indicates roughly the amount of bilirubin reaching the intestines. This amount is high in haemolytic disease, and low in biliary obstruction, or in hepatocellular jaundice with severe intrahepatic obstruction.

Liver Excretory Function

The main substance (other than bilirubin) which has been used for testing the excretory function of the liver is bromsulphalein. This dye is removed from the blood almost exclusively by the liver, and when a test dose is injected intravenously the rate of disappearance from the blood is taken as a measure of hepatic function. If a dose of 5 mg. per kilogram of body weight is injected, the concentration in a blood sample taken forty-five minutes later should be not more than 5 per cent of that in a sample taken five minures after the injection. The test may be made rather more sensitive if plasma concentration is also measured fifteen and thirty minutes after the injection. This test has been used extensively in America, and published results show that it is both sensitive and specific for liver cell disease, whether acute or chronic. It is, however, not suitable for use in obstructive jaundice.

Protein Metabolism

It is believed that plasma albumen is produced by the liver, and that plasma globulins derive mainly from the cells of

TABLE I — USUAL FINDINGS IN THE COMMONER

		Van den Bergh		Urine	
		Immediate Direct	Indirect	Bilirubin	Urobilin and Urobilinogen
Infective Hepatitis	Very Early	O to ±	N to ±	±	N
	Middle ..	+	+ to ++	+	+
	Late ..	O to ±	N to ±	O	N
Cirrhosis		O to +	N to +	O to +	+
Obstructive Jaundice	Partial ..	+	± to ++	± to ++	N to ±
	Complete ..	+	+++	+++	O
	Complicated	+	+ to ++	± to ++	+
Haemolytic Jaundice		O to ±	± to ++	O to ±	N to ++

N=Normal level. O=Negative or absent. ±=Trace or weak positive.

the reticulo-endothelial system. In liver cell disease plasma albumen tends to fall below its normal level of 3.5–6.0 per cent., while plasma globulins tend to rise above their normal level of 1.5–3.0 per cent. The combination of a low albumen and raised globulin is very suggestive of some form of hepatitis. It is not a very sensitive test, but is usually found positive in the more chronic types of hepatitis (*e.g.* cirrhosis).

Flocculation Tests

There is a large number of flocculation tests which depend upon abnormalities of the serum proteins. The most useful are the thymol turbidity and flocculation tests of MacLagen. The thymol turbidity test gives a normal value of less than four units. It is most commonly positive in liver cell disease, particularly in infective hepatitis (100 per cent.), less so in " serum " or " syringe " hepatitis (about 65 per cent)., and still less in cirrhosis (about 33 per cent.). It is generally negative in the hepatitis of chemical poisoning (*e.g.* arsenic), in obstructive jaundice (sometimes even when complicated by liver cell damage or infection) and in carcinoma of the liver (primary or secondary). It is occasionally positive in diseases which are

FORMS OF LIVER DISEASE AND JAUNDICE

FAECES	SERUM			
Visible Stercobilin	Alkaline Phosphatase	Albumen	Globulin	Thymol Tests
N	N	N	N	N
N to low	+	N	N to high	++
N	N	N	N	+
N	N to +	Low	High	N to ++
N to low	N to ++	N	N	N
Low	+ to ++	N	N	N
N to low	N to ++	N to low	N to high	N to +
N to ++	N	N	N	N

+ = Positive. ++ = Strong positive.

not primarily hepatic, *e.g.* congestive heart failures, sub-acute bacterial endocarditis, rheumatoid arthritis, infective mononucleosis and virus pneumonia: but there may of course be some liver malfunction in these conditions.

The thymol flocculation test, which is merely a second stage of the thymol turbidity test, is normally negative: when positive it has a significance similar to that of the turbidity test, but it appears to be slightly more specific for liver disease. There are many other flocculation tests used in the investigation of liver disease, the best known being the colloidal gold and cephalin cholesterol tests: but these do not possess the combined sensitivity and specificity of the thymol tests.

CARBOHYDRATE METABOLISM

The liver plays an essential part in the metabolism of glucose, but this is not found to be significantly altered except in the more severe cases of liver disease. And as such alterations may also result from abnormalities of other organs, *e.g.* pancreas, adrenals, pituitary, thyroid, more attention has been paid to the metabolism of other sugars. Laevulose (fructose) and galactose are also taken up by the liver from the blood, but are less

affected by diseases of other organs. They may be administered orally or intravenously, and the rate of liver uptake can be deduced by following either the concentration in the blood or the amounts excreted in the urine. The best test is probably the intravenous galactose tolerance test with estimations of blood galactose levels. It is specific and moderately sensitive, and as it is unaffected by biliary obstruction it may be used to assess liver cell damage in that condition: it is however rather laborious to perform.

Lipid Metabolism

In obstructive jaundice there is usually a rise in the total blood cholesterol. On the other hand, in jaundice from liver cell disease the total cholesterol is generally normal, but there is a fall in the proportion of cholesterol esters to free cholesterol. As these changes are neither very consistent nor well correlated with the severity of liver disease the test is little used nowadays.

Detoxication

Benzoic acid is detoxicated in the liver by combination with glycine to form hippuric acid, which is excreted in the urine. On this basis Quick developed his hippuric acid excretion test, in which the excretion of hippuric acid is measured after a test dose of sodium benzoate administered orally or, preferably, intravenously. This simple test is a fairly sensitive index of liver cell malfunction, and is quite specific provided that abnormalities of renal excretion are excluded; it is therefore advisable to carry out a simultaneous urea clearance or phenol red excretion test. The hippuric acid test can be performed in the presence of biliary obstruction.

Miscellaneous

The serum alkaline-phosphatase level is usually increased above its normal range (3-13 units/100 ml.) in liver disease; the reason is not known. The increase is greatest in obstructive jaundice, when values of more than 40 units/100 ml. are common. In hepatocellular disease the increase is moderate, usually below 30 units/100 ml. In haemolytic jaundice the level is normal. Although the changes in phosphatase level are

not constant enough to be absolutely diagnostic, in conjunction with other tests they are often of diagnostic value.

Clinical Applications

Liver function tests are used for two main purposes: for the differential diagnosis of diseases of the liver and for assessing the degree of liver cell damage. For differential diagnosis no single test is adequate, and it is necessary to employ a " battery " of several tests. It is convenient to employ those tests which can all be carried out on a single sample of clotted blood. Those most commonly used are the Van den Bergh, the serum alkaline-phosphatase, the serum albumen and globulin levels, and the thymol turbidity and flocculation tests. In addition, the urine should be examined for bilirubin, and the stool examined macroscopically for pigment. In most cases the results of these tests, in conjunction with the clinical findings, will be enough to establish the diagnosis. The usual findings in the commoner forms of liver disease and jaundice are given in Table 1. For the diagnosis of very mild forms of hepatocellular disease when the routine tests are all normal the bromsulphalein test may be valuable.

Assessment of the degree of liver cell malfunction may be required, for instance, in following up cases of acute hepatitis to determine the degree of residual damage; in determining the degree of associated liver cell damage in diseases which are not primarily hepatocellular; or in judging the suitability of patients with liver disease (whether due to biliary obstruction or cirrhosis) for surgical treatment. When additional tests are required the bromsulphalein test is probably the best when obstruction is absent: when obstruction is present the hippuric acid excretion test is best if renal function is satisfactory, and the galactose tolerance test when it is not. These extra tests are rarely necessary, for the standard tests mentioned above give a good deal of information on such points. For instance, the thymol test is the last to become negative following infective hepatitis and is a sensitive index of incomplete resolution. In cirrhosis the serum albumen test is useful for selecting patients for lieno-renal-anastomosis, for patients with a level of less than 3 per cent. are unlikely to do well.

SUMMARY

Of the many tests of liver function which are available only half a dozen or so are of much value in routine clinical practice. Owing to the great variety of diseases which must be distinguished in the differential diagnosis of liver disease, no single liver function test is adequate for all purposes. In most cases sufficient information can be obtained from a group of simple tests which can be performed on a single sample of serum. Occasionally one of the more elaborate tests is necessary to gain additional knowledge.

SURGICAL NEUROLOGY*

BY

GEORGE L. ALEXANDER, F.R.C.S.

Neurological Surgeon, United Bristol Hospitals and South-Western Region.

It is my intention to discuss some of the diagnostic considerations in the commoner conditions for which neurosurgical treatment is indicated, with special reference to choice of patients for specialist consultation. At the outset, I wish to emphasize the importance to the surgeon nowadays of forecasting in advance if possible the pathology of the lesion to be treated, because the plan of attack sometimes depends on fore-knowledge of the pathology.

(Operations for alleviation of pain were touched on, with special reference to trigeminal neuralgia. The characteristics of the paroxysmal neuralgia were outlined and the importance of differentiating the true paroxysmal neuralgia from central trigeminal pain in advising treatment was emphasized.)

The neuralgia which can be cured by interruption of conduction in the trigeminal nerve comes in attacks, is frequently precipitated by stimuli on skin of the face of mucosa or mouth, is brief in duration and ceases *completely* between attacks. I believe that in alcohol injection, if the alcohol is injected slowly and in sufficient amount *into* the ganglion, the resulting anaesthesia and alleviation of pain are permanent. This procedure occupies about as much time as an operation. Operation is chosen for those cases in which the second and third division areas are affected by the pain: the virtue of operation is the preservation in most cases of corneal sensation. In dealing with the danger of trophic keratitis where the cornea is anaesthetic, avoid eye-drops and ointments, particularly for instillation by the patient. Another indication for root-section is found in some cases of trigeminal pain due to ineradicable peripheral foci of irritation.

* Abridged from an Address delivered to the Devon and Exeter Medico-Chirurgical Society on Thursday, 26th October, 1950.

Another field for surgery is found in intractable pain in the limbs and trunk. Cordotomy is not invariably successful; and in cases of painful stump and phantom limb, percussion of the stump, a treatment which incidentally originated from Dr. Carleton in Bristol, is now largely replacing antero-lateral cordotomy.

On the subject of epilepsy, two points are important: eye-witness accounts of attacks and the need for relatives to accompany patients at consultation. If epilepsy occurs for the first time in an adult there is a responsibility for the clinician to exclude tumour as a cause of the epilepsy. Encephalography or arteriography are often required in the investigation.

Spontaneous subarachnoid haemorrhage is commonly due to leakage from an intracranial aneurysm or congenital angioma: many of the patients are young persons. Recent advances in technique have greatly extended the scope and possibilities of surgery in the cure of those lesions.

Let us now turn our attention to conditions of the spine and spinal cord. Epidural spinal abscess is a surgical emergency requiring immediate treatment. The danger in that condition arises from the risk that clotting in epidural veins will become sufficiently extensive to arrest venous drainage from the cord, with softening of the cord as a result. This risk is real because the organism in epidural spinal abscess is so frequently a coagulase-positive staphylococcus. Let me remind you of the apyrexial character of some cases in this condition, and the frequency of root pains in most cases.

Another emergency situation, not yet widely recognized, is compression of the cauda equina by massive protrusion of lumbar disc. Persisting pressure on the sensory roots could cause permanent damage to them. I have encountered cases in which control of the sphincters, and potency, were permanently lost after a very short period of compression.

Head injuries: only a minority of cases require surgery. In closed head injury the most important guide in assessment is the " drift " of the case. Deterioration, under observation, in state of consciousness or in neurological findings is an indication for obtaining a neurosurgical opinion. In cases with rapid deterioration, notably where there were early signs of extradural

haemorrhage, neurosurgical advice should be sought by telephone, and operation might best be undertaken on the spot if at a distance from the neurosurgical centre. Lives have been saved by co-operation and prompt action on those lines.

(Mr. Alexander also dealt briefly with infantile hydrocephalus and spina bifida, with brain abscess, and with essential and malignant hypertension, giving some hints as to selection of cases for surgery.)

The chief criterion in spina bifida is competency of the sphincters. I do not advise operation if the infant shows retention of urine with overflow and has a patulous anus: there is always a "saddle" anaesthesia in such cases. The caudal end of the cord in gross degrees of spina bifida is deficient and repair of the defect cannot make good that deficiency of neural tissue.

In Memoriam

ERNEST URQUHART BARTHOLOMEW

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JOHN ALEXANDER NIXON
C.M.G., M.D., F.R.C.P.

JOHN RAYMOND EDEN SANSOM
M.B., Ch.B., B.Sc.

JAMES SWAIN
C.B., C.B.E., M.D., M.S., F.R.C.S.

JOHN ODERY SYMES
M.D.

Obituary

JOHN ALEXANDER NIXON

C.M.G., M.D. Cantab., F.R.C.P. London

Colonel A. M. S.; Emeritus Professor of Medicine in the University of Bristol.

All medical colleagues in Bristol and the South West will feel a sense of loss in the passing of Professor J. A. Nixon, after a short illness, on 17th March. For very nearly fifty years he had been a notable figure in the professional world. He was the son of Robert Bell Nixon, and the grandson of Surgeon-Major Alexander Hunter, Madras Army; and was educated at Hurstpierpoint, and at Gonville and Caius College, Cambridge, where he was a Choral Exhibitioner and Tancred Student. Thence he went to St. Bartholomew's, where he was President of the Abernethian Society and Editor of the Hospital Journal. After qualifying he held house appointments at Barts' and at the Metropolitan Hospital.

In 1902 he came to the Bristol Royal Infirmary as house physician, and then senior resident officer. Having taken the

M.R.C.P., he was in 1906 elected Honorary Assistant Physician to the Royal Infirmary, with charge of dermatological cases—for in those remote days a separate " Department " had not come into being. Three years later he was elected full Physician, and shortly after F.R.C.P. During the 1914–18 war he held a commission as Temporary Colonel, A.M.S., being awarded the C.M.G. in recognition of his services in France and Germany. On resuming his consultant work he was appointed Professor of Medicine in the University of Bristol in 1924.

Some indication is given of the wide scope of his work and interests by a summary of his appointments: to the staffs of Southmead Hospital, Cossham's Memorial Hospital, and Bristol Mental Hospital; Examiner to the National University of Ireland; Inspector for the General Medical Council; President of the Bristol Medico-Chirurgical Society (1922), of the Bath and Bristol Branch of the B.M.A. (1929), and of the Association of Physicians; FitzPatrick Lecturer (R.C.M.) in 1941; and Long Fox Memorial Lecturer in 1930. But outside purely professional activities he will be remembered as a keen member of the Medical Book Society and of the Victoria Square Gardens Committee, for his active interest in the work of St. Andrew's Church, in Freemasonry, in the history of medicine and in music; and at an age when most of us have " retired " he might be found playing a sound game of tennis or cycling over the Mendips with his family.

Our readers will naturally remember him for the numerous contributions to our pages: particularly " The Influence of Food on Prevention of Disease ", and his Presidential Address on " The Debt of Medicine to the Fine Arts ". Notable among the many contributions from his pen were the *Textbook of Nutrition* (1938) and *Health and Sickness in the Merchant Navy* (1941). He was associated with the *Journal* for many years from 1912 and Editor for nearly twenty-two, during which time he produced the fifty-year index, and the *Bristol Medical School Centenary Memorial*, and sustained our fortunes through the difficult years of total war.

To his wife and family we extend our very sincere sympathies.

Meetings of Societies

Bristol Medico-Chirurgical Society

Honorary Members:

LEMUEL MATTHEWS GRIFFITHS
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GEORGE PARKER, M.D. Cantab., LL.D. Brist.
JOHN ALEXANDER NIXON, *C.M.G.*, M.D., Cantab.

Presidents:

Lists of Presidents were published annually until 1948. Dr. Corfied, President-elect in 1938, should have assumed office in October, 1939, but owing to the outbreak of war the Society did not meet until 1945.

1945–46	HUGH HADFIELD CARLETON, D.M. Oxon.
1946–47	HUBERT CHITTY, M.S. Lond.
1947–48	THOMAS MILLING, M.B., B.Ch. Belf.
1948–49	HENRY JAMES DREW SMYTHE, *M.C., T.D.*, M.D., M.S. Lond.
1949–50	HUGH JAMES ORR-EWING, *M.C.*, M.D. Lond.
1950–51	WILLIAM AUSTEN JACKMAN, *T.D.*, M.B., B.Ch. Brist.

The Third Meeting of the 1950–51 session was held on Wednesday, 13th December, 1950. The evening was devoted to a discussion on Geriatrics. We publish the opening papers in this issue. **"The Medical Problems of the Present Day"**, by Dr. C. T. Andrews, M.D., F.R.C.P. **"Some Modern Developments"**, by Dr. T. S. Wilson, M.D. **"The Problem in the Bristol Clinical Area"**, by Dr. William Hughes, M.D., M.R.C.P.

The Fourth meeting of the Session was held in the University on Wednesday, 10th January, 1951, and was devoted to the "flesh-creeping" subject of **"The Medical Aspects of Atomic Bombing"**. In effect the subject appeared to hold little of medical interest, the only doubtful question being whether those affected died at once or after a short interval, and treatment hardly affects the issue. We expect to publish the opening papers by Drs. Tudway and Challenger in our next issue.

The Fifth meeting of the Session was held on Wednesday, 14th February, 1951. Mr. A. Dickson Wright, M.S., F.R.C.S., delivered an address on **"The Management of Intestinal Obstruction"**.

The Sixth meeting of the Session was held on Wednesday, 14th March. Dr. A. M. G. Campbell gave an account of **"Some Rare Diseases Contracted from Animals"**. Dr. J. Naish described **"Eczema of the Colon"**.

Devon and Exeter Medico-Chirurgical Society

On Thursday, 21st December, 1950, Dr. Margaret Hadley Jackson gave an address on **"Vaginal Discharge"**. [*Lancet*, 1951, p. 92.]

At a clinico-pathological meeting of the Society on 15th February, Mr. F. C. Durbin presented the case of an interesting tumour associated with trauma arising in the thigh of a boy aged twelve, which was first thought to be an exuberant reaction to injury but proved eventually to be a fibrosarcoma. Discussion turned on whether or no hindquarter amputation should be undertaken.

Mr. P. M. G. Russell described a maternal death of a diabetic multipara: during the puerperium she developed evidence of right heart failure and was found at autopsy to have, in addition, multiple thrombosis in the anterior pituitary. Mr. R. Wayland Smith described an unusual stomach lesion on which he had operated—a cyst-adenoma of the pylorus showing evidence of malignant change; and also an uncommon case of intestinal obstruction due to a developmental anomaly in the ileum described by Bland Sutton. All these cases were discussed from the pathological angle by Dr. G. Stewart-Smith, who also described a case of meningeal dissemination of medulloblastoma. Mr. Wayland Smith also presented a case of Brodie's disease of the breast on which he had operated, and Mr. K. P. S. Caldwell one of ureteritis cystica. In both these cases the pathology was discussed by Dr. C. P. Warren. There were many admirable colour and microphotographs prepared and shown on the screen by Mr. Dyson. Lively discussion followed the presentation of each case and more than forty members were present.

South-Western Laryngological Association

A meeting of the Association was held at Bristol General Hospital on Saturday, 6th January, Mr. G. R. Scarff, President, in the chair. A number of unusual cases were shown and produced a lively discussion. Spontaneous empyaema of nasal septum, recurrent pharyngeal polypus, subglottic granuloma (E. W. W.); congenital fenestration of faucial pillars, laryngeal changes secondary to ovarian arrhenoblastoma, chronic laryngitis (G. R. S.); naso-pharyngeal cyst (Thornwaldt's disease), chondro-sarcoma of nasal septum, deafness due to Paget's disease (J. A. J.); cerebellar ataxia from encephalitis, sarcoma of middle ear (H. D. F.); cicatricial stenosis of naso-pharynx (D. O. C.). The next meeting will be at Birmingham on Saturday, 13th October.

British Medical Association

Bath, Bristol and Somerset Branch

A meeting of the Branch was held at the Royal United Hospital, Bath, on Wednesday, 7th February, 1951, at 8.30 p.m. Dr. Bradley of the Ministry of Health, gave an address on "**The Common Cold**".

Bristol Division

A meeting of the Bristol Division was held in the University of Bristol on Friday, 5th January, 1951. Sir Lionel Whitby, *C.V.O.*, *M.C.*, delivered a B.M.A. Lecture on "**The Common Anaemias**".

A meeting of the Bristol Division of the British Medical Association was held on Wednesday, 21st February. Mr. A. Lawrence Abel, F.R.C.S., delivered a lecture: "**Ideas from Overseas,**" illustrated by a cinematograph film.

West Somerset Division

At a meeting of this Division at Yeovil Hospital on Thursday, 25th January, 1951, Mr. T. Holmes Sellors, Consultant Surgeon to the Middlesex Hospital, delivered an address on "**Cardiac Surgery**". The lecture was most interesting, was illustrated by coloured lantern slides, and was well attended.

On Thursday, 8th March, at Bridgwater, Dr. Robert Forbes (Secretary of the Medical Defence Union), spoke on "**Medical Hazards in Medical Practice**".

Future meetings.—On Thursday, 3rd May, at Taunton: Mr. Ronald Belsey will talk on "**Recent Advances in Thoracic Surgery**".

Local Medical Notes

Appointments

University of Bristol.—

G. C. Lennon, Ch.M., M.R.C.O.G.—Professor of Obstetrics.

J. E. Cates, M.D., M.R.C.P.—Lecturer in Medicine.

R. E. Horton, F.R.C.S.—Lecturer in Surgery.

P. F. Redman, M.B., Ch.B., M.R.C.O.G.—Lecturer in Obstetrics.

Coralie W. Rendle-Short, M.B., Ch.B., M.R.C.O.G.—Head of Department of Obstetrics, Makerere College, Kampala, Uganda.

M. P. Embrey, M.D., B.Sc., F.R.C.S., M.R.C.O.G.—Deputy Professor, Nuffield Department of Obstetrics, University of Oxford.

C. A. Brown, M.D., D.O.M.S.—Consultant Ophthalmologist, Bristol.

F. J. Farr, M.B., D.M.R.E.—Consultant in Radiology, Dewsbury, Batley and Mirfield Hospitals.

E. J. Harries, M.D.—Consultant Pathologist, South Somerset.

S. D. Loxton, F.R.C.S.—Consultant Obstetrician and Gynaecologist, United Bristol Hospitals.

T. A. B. Mason, D.M.R.—Consultant Radiologist, West Cornwall.

T. C. St. C. Morton, *C.B.*, *O.B.E.*, M.D., F.R.C.P., D.P.H., D.P.M.—Area Pathologist, West Cornwall.

J. Winter, M.B., D.M.R.D.—Consultant Radiologist, South Somerset.

Degrees and Diplomas

University of Bristol.—

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Chew Stoke
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H. CHITTY

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